If now A is the nozzle area in square feet, and W the quantity of steam
passed in pounds per second,

r WV2
Co ......A~

since PA7/' — • P.AV.

P
Let .v •-= ..... - --3 1 then this expression, giving the weight passed per unit of

area, reaches a maximum for some definite value of A:. Writing

•'-••= o, when *y* is a maximum;

whence

^Cr :•• 2 .. \ .)"« • • « at tiic maxmuim point
\|*n + if*

--:•" critical pressure ratio.

For superheated steam the value of *n* is 1-3, and for saturated steam 1*135, These values give a critical pressure ratio of 0-546 for superheated steam, and 0-577 for saturated steam.

Inserting the value of the critical drop in the formula for discharge, a simple expression for discharge per square inch of noz/Je area is obtained:

•(3) W
a

where a is the nozzle area in square inches;
PH, the initial pressure in pounds per square inch;
Vj, the initial specific volume of steam in cubic feet per pound;
k, a constant; 0-315 for superheated steam, and 0-3 for saturated steam.

Many experiments have been carried out to ascertain the actual value of *k* as compared with the theoretical values stated above. In general, experimental evidence points to the fact that a value of *k* - = 0-31 may be attained in a well proportioned nozzle, both for superheated and saturated steam.

This means that the discharge of saturated steam exceeds the theoretical